The Sight-Saving Review

Volume XVII Number 2

Summer, 1947

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Eye Comfort and Efficiency*

Charles D. Gibson

PRACTICAL suggestions on lighting, paint, and other equipment recommended for good seeing conditions in the classroom.

TWO or three years ago the title of this paper would have been "School Lighting" instead of "Eye Comfort and Efficiency." The emphasis would have been on "how much light should we have in various spaces for different seeing tasks" while today's emphasis is on "how well can we see and at what cost in terms of human resources."

School lighting as a field of interest over the past years was confined for the most part to a foot-candle emphasis. To many school administrators this foot-candle emphasis came to mean artificial lighting systems, preferred light sources, more fixtures, more lamps, and faster spinning electric meters. Violently differing opinions and confusion represented many of the impressions received by the average layman looking for the truth in this important school-housing field.

The new emphasis on "eye comfort and efficiency" starts out with the elementary factors advanced in the "school lighting" era but expands and refines them into a much broader concern which considers equally all lighting systems and all light sources, and embraces the total visual environment as the chief factor affecting not only visual acuity, but also the mental, physical and emotional growth and behavior patterns of students—young and old.

The "eye comfort and efficiency" approach to this problem claims nothing new but emphasis and the application of principles long known but seldom applied. This change of accent, however,

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is no trivial thing. It places the recommendations in this important field on a scientifically defensible and educationally acceptable basis. It removes illuminating engineering practice from the realm of controversial recommendations based on desirable quantities of light where there is little agreement among the "experts," and places it in a solid position defended by the noncontroversial principles of brightness and brightness-differences which find no serious opposition from any of the recognized students of the seeing-in-the-schoolhouse problem.

The "eye comfort and efficiency" approach to this field not only establishes ultimate and educationally acceptable goals which are confirmed by all the informed researchers, but also makes it possible for every student attending school anywhere in the world to benefit from the recommendations supported by this new emphasis. In this country alone we have thousands of schools that have no access to electric power and many more thousands which have no source of artificial illumination whatsoever. The first things recommended for conditioning the environment for visual comfort and efficiency have nothing to do with electrical equipment. Eye comfort and efficiency in the average classroom today can be improved at least 100 per cent without spending one cent for wire, conduit, outlets, fixtures, lamps, switches, or electric current. In fact, until other parts of the total visual environment are properly conditioned one stands a good chance of reducing eye comfort and efficiency by augmenting existing lighting systems or installing new ones.

Recommendations based on the "eye comfort and efficiency" approach are set up in a priority order so that progress can be made toward an established goal by large or small steps. These steps are broken down into such small "risers" that a school finding only five dollars a year to spend in this critical field can put that small sum to constructive use and actually can improve the visual environment, thus providing its students greater eye comfort and efficiency. Old schools or new schools, poor schools or rich schools, small schools or large schools, country schools or city schools—all can make real progress toward improving the visual environment by spending what they can, when they can, in a predetermined program toward an ultimate goal.

Before one can understand the principles advanced by the "eye

comfort and efficiency" approach, he must become familiar with a few lighting terms.

The foot-candle is the unit used to measure light intensity. The quantity of light falling upon a given surface is measured in foot-candles. The foot-candle meter is the instrument used to make foot-candle measurements.

Reflection factor is a second element to be considered, and is as important to a good visual environment as are foot-candles. Light falls upon a surface which absorbs a portion of the light and reflects the remainder. This reflected light produces brightness. The percentage of the total amount of light falling upon the surface which is reflected by the surface, is the reflection factor. For example, assuming an equal number of foot-candles fall on all parts of this page, we find that the white paper reflects about 80 per cent of the light falling upon it, giving it a reflection factor of 80 per cent, while the black type reflects about 3 per cent of the incident light giving it a reflection factor of 3 per cent.

Brightness is the luminous intensity of any surface. Brightness may be created either by reflection or by direct transmission.

The foot-lambert is the unit used to measure brightness. The average brightness of any reflecting surface in foot-lamberts is the product of the illumination in foot-candles by the reflection factor of the surface. All brightness measurement for our purposes can be translated into foot-lamberts.

Tying these factors together, we find that when a number of foot-candles, say 30, fall on a task which has a 60 per cent reflection factor, 40 per cent of the original foot-candle energy is absorbed and 60 per cent of it, or 18 foot-lamberts, is reflected, causing the object to have brightness. It is this brightness which activates the seeing process. The foot-lambert, then, and not the foot-candle, becomes the prime factor in any consideration of eye comfort and efficiency.

Any visual environment is composed of *visual fields*. These fields are areas of varying size centering along the optical axis. The central field is considered to be the same as the visual task. If the visual task is reading a book, then the page of the book is the central field. The small one-degree field lying on the center of the optical axis is the area in which all critical seeing is done. This area is called the focal field. The surrounding field extends approximately 30 degrees

on each side of the optical axis or line of sight. Thus, its total area would be approximately 60 degrees in the center of the total visual field. The peripheral field lies outside the surrounding field and includes an area approximately 120 degrees vertically and 160 degrees horizontally, centering on the optical axis.

The "eye comfort and efficiency" approach takes into consideration all brightnesses, either transmitted or reflected, and their relation to the total visual environment. The conditioning of the total visual environment which is composed of the above-named visual fields, consists of reducing excessively high brightnesses such as those of light fixtures or direct sunlight, and increasing the excessively low brightnesses such as those of blackboards, dark walls, desks, and floors. This "balancing" of the brightnesses theoretically should be refined until there is high brightness-difference in the task itself, such as those found between the best grades of flat white paper and the finest quality of flat black ink, while the brightness-differences between the task itself (central field) and the brightnesses found in the remainder of the total visual environment (surrounding and peripheral fields) are as small as possible. In the task itself we want high brightness-difference, or contrast; while the brightness-differences between the task and all other areas within the total visual field are kept as low as possible.

Strictly from the visual efficiency standpoint, the ultimate goal would be unity of brightness between the task and the total visual environment and a 100 per cent brightness-difference or contrast within the task itself. Although "unity of brightness" may be considered a theoretical ultimate goal, an environment having absolute conditions of brightness-balance cannot be attained in a schoolroom. Unity of brightness, therefore, is not to be considered a practical goal for school areas. Any room conditioning, however, which works toward this goal is a step toward creating a better visual environment.

The remainder of this presentation will concern itself with the application of brightness principles to the schoolroom environment. The principles themselves are of no value unless they can be applied within the framework of average school conditions.

The first major part of the room conditioning program deals with increasing and balancing the excessively low brightness areas. A

painting schedule should be adopted to condition the various room surfaces.

Ceilings should be finished with an 85 per cent reflection factor, flat-white paint having either an oil or a casein base. White should be used because of its high reflection factor. The finish should be flat, or nonglossy, because a flat finish diffuses the light that strikes it without reflecting highlights that appear in a glossy finish. Field experiments have shown that brightnesses on the inside row of desks have been raised as much as 100 per cent by doing nothing more to the room than painting a drab ceiling with flat-white.

Upper walls from the ceiling line to the wainscot should be finished with a minimum 60 per cent reflection factor paint and lower walls from wainscot height down, including the baseboard, should be finished with a minimum 40 per cent reflection factor paint. Finishing entire wall areas from ceiling to floor with a minimum 60 per cent reflection factor paint is considered good practice where maintenance conditions permit. Painting the baseboard to match the lower walls is necessary to eliminate a strong band of brightness-difference at a location that often falls well within the surrounding visual field of students reading or writing at desks.

The intelligent use of color is essential for the prevention of an institutional-like atmosphere. There need be no conflict between color harmony and a balance of brightness.

Trim should be finished with a 60 to 40 per cent reflection factor paint. The trim may be of a different color from the walls, but should retain the same reflection factor values to avoid objectionable brightness-differences.

Desks and equipment finishes should have from 30 to 40 per cent reflection factor. By desks is meant the whole desk including the top, frame, and seat. "Equipment" includes all the casework, shelving, supplementary tables, machines, etc.

Floor finishes should have from 30 to 40 per cent reflection factor. Light maple hardwood floors, well maintained, fall within this suggested reflection factor range. Light shades of tan and "marbleized" patterns have proved satisfactory in composition floor coverings because of their color and ease of maintenance. The practice of installing floors having decided checkerboard patterns of color should be avoided.

Chalkboards are now available with a practical reflection factor of 30 per cent. Where conventional blackboards are installed, convenient means such as sliding panels should be available for covering the blackboard with lighter colored surfaces when it is not in use. A trend is evident in some sections toward reducing the chalkboard area in schoolrooms to an eight or twelve-foot panel on the front wall.

The second major part of the room conditioning program deals with the reduction and balancing of the excessively high brightness areas.

Daylight Control

The sky, direct sunlight on windows, and the bright wall areas of adjacent buildings are the most common sources of excessive brightness and upset the desired balance of brightness unless windows are shielded in some manner. The desirable features of a satisfactory window shield are:

1. It must exclude direct sunlight and admit as much light as possible into the classroom while at the same time presenting a surface of comfortable brightness.
2. Its position should be fixed and require no manipulation.
3. It must be easy to maintain.

If shades or Venetian blinds must be used they should meet the following specifications:

1. Fabric window shades should be of the multiple roller type permitting independent shading of the upper and lower portions of the windows, and they should be made of highly translucent material of a color harmonizing with the wall colors.
2. Venetian blinds, if used, should be of light colors to increase light reflection.

Artificial Lighting Systems

The following are points to be evaluated when selecting an artificial lighting system:

1. It should produce a uniform distribution of shadow-free and glare-free illumination with the intensities necessary to maintain an acceptable brightness-balance between the central field and other surfaces within the total visual environment.

2. Consideration should be given to probable deterioration of efficiency in service, under prevailing conditions of school operation and maintenance.

3. Lighting fixtures selected should not produce a surface brightness that exceeds a 1–10 brightness-difference for the surrounding field, assuming the line of sight to be horizontal.

The function of an artificial lighting system in schools is to supplement daylight. It can play a big part in increasing the brightnesses of the darker areas but, at the same time, must not itself create areas of excessively high brightness. The first cost and maintenance expense of any artificial lighting system must be considered against the average number of hours per day artificial lighting will be needed in the schoolroom.

New school construction offers many opportunities to create a schoolroom environment that provides acceptable conditions for eye comfort and efficiency. New design trends make possible multisource daylighting, adequate daylight controls, properly designed interiors, and acceptable artificial lighting systems.

Real programs on the conditioning of schoolrooms for visual comfort and efficiency will be apparent in direct ratio to the interest and sponsorship evidenced by school administrators over this country. The administrator first must be convinced himself that the brightness emphasis is valid and then must insist that it is applied to his plants, old or new. They have been applied time and again and have proved their effectiveness.

There are several specific steps school administrators could take that would facilitate this program. One relates to the reflection factor of school equipment. It will be impossible to make great strides forward until the manufacturers of school equipment (desks, machines, chalkboards, casework, etc.) make these items available in minimum 30 per cent reflection factor colors. Floor covering manufacturers also should be requested for high reflection factor materials. Lighting equipment manufacturers should be asked to meet the low brightness requirements necessary if any significant brightness-balance is to be achieved in schoolrooms. Architects should be encouraged to work with designs that lend themselves more readily to the brightness emphasis. Maintenance

schedules should be set up to keep present equipment functioning at somewhere near potential efficiency.

A program of conditioning schoolrooms for visual comfort and efficiency offers the school administrator one of the finest opportunities he will get to make a real, tangible, effective, and vastly important contribution to the total well-being of students young and old.

Meeting the Needs for Professionally Prepared Teachers in Sight Conservation*

Olive S. Peck

EMPHASIZES need for knowledge of principles of eye hygiene for regular grade teachers as well as for sight-saving class teachers.

THERE are two classes of teaching personnel who should be interested and trained in the conservation of vision: teachers of partially seeing children and, to a certain degree, regular grade teachers.

There is rather universal agreement on what the preparation of sight-saving class teachers should be. For some time, courses have been set up which follow a uniform pattern, more or less. First of all, about 30 hours of medical lectures are required. Though this, at the outset, may seem extreme to some of the doctors, many of them have found that teachers understand the medical lectures and that it is important to give teachers medical information in regard to the eyes—particularly of children. Teachers should get enough information to be able to forget a great deal and still have some residual information. This will be very helpful to sight-saving class teachers even if it only affords them a vocabulary which makes it possible to talk with the doctors concerning the eye conditions of the pupils under their care.

In addition to the lectures on the anatomy and physiology of the eye, observation in the eye clinics is required. This is helpful to the teacher because often she is the one who has to guide parents to the doctor and if she knows the possibilities for treatment she can help in obtaining the proper medical aid. Adequate preparation for teachers of partially seeing children must also include lectures on

* Presented during the 1946 Conference of the National Society for the Prevention of Blindness, November 25–27, 1946, New York, N. Y.

administration, teaching techniques, vocational guidance, and observation and participation in a laboratory sight-saving class. That, in the main, is the type of preparation which is given to the teacher beginning sight-saving class work.

To most of the trained teachers this area of special education is an intensely interesting field. It is ever changing. It affords the variety due to changes prevailing in the educational world. All the highly individualized teaching techniques suitable for sight-saving classes are hers to use. She maintains, as well, an interest in the new techniques in medicine as they relate to eye health, and in the advances in lighting engineering. It is obviously not monotonous work for a versatile, intelligent teacher. An added attraction is that the demand for such teachers still exceeds the supply.

In advanced courses for sight-saving class teachers, somewhat the same plan is followed, with more medical lectures, more work in clinics, more advanced work in the field of lighting, and discussion of the problems of a sight-saving class in relation to home problems, which includes home lighting and some health aspects.

Of course, the knowledge which these teachers have gained must be transformed into a way of living for the partially seeing children who attend sight-saving classes. This way of living must include instruction of these children in eye hygiene for, after all, the professional preparation of the teacher is to aid her in preparing the child in habits of eye hygiene. The aim of sight-saving classes, in addition to providing an education equivalent to that of any child of like mentality, is to help the pupils to acquire skills, daily habits, and attitudes which will enable them to conserve their sight and to provide a suitable background of knowledge and attitudes toward occupations which will enable the pupils to become self-supporting without further impairment to their eyesight.

Since one of the purposes of the sight-saving class is to conserve sight, the acquisition of proper habits and attitudes is very important. The eyes are used in all the activities of life, and it is the manner of their use and the avoidance of their abuse that will, in part, insure their health. If a habit is to be useful in life, the earlier it is formed, the greater assurance of its effectiveness later. While habits are being formed constantly through the ordinary classroom activity and experience in work and play, through learning by

listening, and through training in manual dexterity, these are incidental forms of learning. In addition, there is need for a more definite knowledge upon which appreciations and habits are based. One of the major aims of education is good health, and much emphasis in sight-saving classes must be placed on health habits. We decided in our classes in Cleveland to introduce eye hygiene as a subject in our sight-saving classroom on the same basis as any other health information is given in the conventional curriculum. This gave it particular emphasis to both teachers and pupils.

The question is, "How much eye hygiene shall we teach children in sight-saving classes, and how?" Overemphasis on diseases of the eye might lead to a neurotic attitude on the part of some pupils, but underemphasis on good eye habits might lead to further vision impairment, increased nervousness, fatigue, and other symptoms of poor health. The problem of teaching eye care is complicated in most sight-saving classes by the presence of two groups of pupils: (1) children with low vision whose eyes will probably suffer no impairment as a result of eye use, but who need to work with proper guidance under good working conditions in order to avoid other eye symptoms; and (2) myopes, or children having other types of progressive eye difficulties, who must work under more controlled and limited conditions. It is important to make clear to the former group that they must use their eyes, and at the same time the latter group must be made to understand that there are certain limitations under which they must work, and that we expect them to accept the limitations cheerfully and with a cooperative attitude.

Of course, restrictions should not be placed upon an individual without giving him some idea of why they are necessary. It is easier for the children to accept restrictions when they know the reasons for them. With the proper background of knowledge and good training in eye habits, many of these children avoid danger in using their eyes. A few disregard instruction, despite warnings, and have to be rescued by the eye physician; but in the main, children cooperate pretty well.

We have had, for many years, a variety of courses in eye hygiene for sight-saving pupils. At first the course was very general because we approached it with fear and trembling, knowing that there was the danger of overemphasis, and we recognized the mental hygiene

aspects of the problem. We now have a graded course of study. It is relatively simple. We teach how the eye functions, simple facts of refraction, and a little about how glasses are made. The children know why they wear glasses. They visit an optician's shop and see how the lenses are ground. They realize that the lenses must be straight. They are taught how to care for their glasses. They know why they sometimes are expensive.

In order further to develop an eye hygiene program, many years ago a sight-saving council of the pupils was formed. It works very satisfactorily. The by-products may have been more important than the main objective, for the children certainly know how to preside at and conduct meetings. The children's council has committees on eye health, safety and information. Through the council other pupils in the building are interested in sight saving, and the sight-saving class pupils feel that they are not the only ones who have to take care of their eyes. They learn to realize that all children need to use their eyes properly. From a safety standpoint, it has been interesting to them because there are many aspects of safety which have to do with vision and with lighting.

Some of the results of this program for the children of the sight-saving council have been improved eye habits and a better attitude toward eye use; an increased knowledge of their own eyes and some general information about light, hygiene, and eye safety for everyone; and an increased interest on the part of the parents. The parents are included because they, too, have to be educated. The council meetings have resulted in greater interest in eye care on the part of the school as a whole; for sight-saving pupils, an awareness of their own eye care, more careful treatment of glasses, a development of poise in public speaking and in conducting meetings, and in a feeling of responsibility for conservation of vision in general.

There are many situations in regular classrooms in which some training in eye hygiene would be very helpful to the teacher. For example, in the average primary room the informal grouping of the children in circles makes it necessary for part of them, at least, to face the light. If teachers knew more about how the eye functions they would realize that light should be on the object looked at and not in the eye of the beholder. Many teachers use the circle arrangement since it is said to be informal. Informality in a classroom does

not depend upon a particular grouping of chairs. It is possible to get an informal classroom situation in other ways.

Some training in vision testing would be very helpful to many teachers. While in some communities nurses perform this function, there are many localities where teachers do this preliminary screening. They should know how to give this test properly and should know something about the implications of the results. They should be aware of the possibilities of placement for children with defective vision.

The teacher in the regular grades is constantly required to solve problems requiring knowledge of eye health and eye hygiene. She has been given some information about eye movements in reading methods courses. This is important, from the psychological standpoint, in developing reading ability. But often not much emphasis is placed on the importance of posture while reading which is important to general bodily health and good eye reading habits. In teaching science there are many units on how we see, lighting, safety, and home safety. Each of these involve knowledge of the eye.

Where we have sight-saving classes, some vicarious training of regular classroom teachers is carried on through contact with a sight-saving class located in the building. Sight-saving class pupils and teachers are interested and talk about it to others. They see the contrast in lighting arrangement of desks, size of type, and many other techniques used. At best much of this learning is hit or miss.

Perhaps the answer to teacher training in regular grades is to place more emphasis on eye hygiene and eye health in the teacher training institution before teaching experience is gained. It should be done at the undergraduate level when the teacher is studying reading methods. A knowledge of how the eye functions might prevent many school failures and perhaps much eye and nerve strain. Such a course might serve to interest some good teachers in following this later with a more complete course which would fit them to teach a sight-saving class.

Medical Guidance in the Plant Eye Program*

L. Holland Whitney, M.D.

EMPHASIZES the necessity for teamwork in carrying on eye health and safety programs in industry.

IT is the responsibility of the medical director in an industrial plant to recognize and to be able to identify problems which arise pertaining to the health and adjustment of employees to their work environment. After having recognized such problems, it is also his responsibility to make suggestions and recommendations to management as to how those particular problems can best be handled. This is not too difficult so far as vision is concerned because we have available experts in various fields pertaining to vision in industry who can be called upon for guidance. Although possibly no one of us is in a position to solve all the problems, we can collectively go a long way toward making a valuable contribution to greater productivity and better industrial morale generally.

We have to remember in planning these programs that we are talking about and dealing with hard-headed businessmen. Sometimes we lose sight of that fact and get ourselves into difficulties. Actually, management and private industry are still, I believe, engaged in business primarily for the profit motive, and therefore any recommendations or suggestions that we make must necessarily be geared to provide a positive balance to that profit sheet.

In the field of vision, we are particularly fortunate in making such recommendations because there are tangible and worth-while contributions to be demonstrated. And these benefits, inasmuch as they

* Presented in Panel Discussion on "Professional Guidance in the Plant Program," during the 1946 Conference of the National Society for the Prevention of Blindness, November 25–27, 1946, New York, N. Y.

are tangible, are something that we can actually spell out to management and indicate how it will make a better contribution—a greater contribution to the over-all program. The progressive industrial medical man should always be on the alert for any developments in the field which will make such contributions. In industry, the programs of rehabilitation, of venereal disease control, of control of tuberculosis in industry, and many other programs have already been validated and actually demonstrated. In general, they are fairly well accepted in occupational health programs. If we want to be progressive, then, we must keep in mind that there are still new worlds to conquer—to mention one—vision in industry. Vision happens to be one of those physical characteristics which can be fairly accurately measured. Visual performance can be charted. Not only that, but if we find the visual faults, we are in the fortunate position oftentimes to do something about their correction.

The speed with which a vision program will take hold in many industries will depend on such factors as the nature of the hazard to the eyes and the visual demands of the majority of the jobs in the industry. The individual working in the hosiery mill, for example, is probably more vitally in need of eye care than the individual who is working in some relatively unskilled labor grade in a plant that does not have such exacting visual demands.

Generally speaking, we can consider the subject of vision under two broad headings: therapeutic and prophylactic. Under therapeutic, come first aid to the eyes, and medical, nursing, and specialized treatment. Under the second broad heading of vision in industry, the prophylactic, should be considered: selection and placement; programs of protection and correction of the eyes; and finally illumination and color.

In summary, I should like to repeat what I said in the beginning, that there is possibly no one of the various groups of professional and specialized individuals qualified to answer all of the problems in conjunction with vision in industry, but it is possible to assemble a team with representatives from each of these fields who together can carry out a worth-while program which will make a positive contribution toward better occupational health.

Ophthalmologic Guidance in the Plant Eye Program*

J. Woodhull Overton, M.D.

DESCRIBES the responsibility of the industrial ophthalmologist both in large plants and in small ones.

AN ophthamologist is a medical doctor who has specialized in the medical and surgical conditions of the eye, and with this background, is prepared to study the eye problems of industry and to contribute to their solution. He finds many opportunities to render service to industrial organizations; he is concerned with all problems which relate to efficient vision in all phases of production. He must understand the entire program, screening out cases of defective vision, testing and correcting these defects, and providing other ophthalmological services. He must have some knowledge of adequate illumination, proper ventilation, as well as a thorough knowledge of the protective services and appliances designed to prevent accidents to eye and limb, and to prevent accidents caused by defective vision. He must also be well-informed on all the factors pertaining to conservation of vision from the point of view of eye health and its relation to general health. He must understand the proper placement of individuals in jobs suitable to their visual abilities. Finally, it is his function to advise and to consult with management in specific problems which constantly arise.

The specific objectives of the ophthalmologist's program are three-fold: (1) to increase production; (2) to reduce human suffering and time lost on the job; and (3) to reduce insurance costs to

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management by the prevention of accidents and the early and proper treatment of eye injuries.

Increase in production is accomplished by several means: (1) by job analysis, with a view to determining visual requirements for each operation; (2) pre-employment examination of employees, on the basis of visual ability; (3) provision for corrective glasses, in conjunction with the optometrist; (4) provision for corrective glasses and other safety equipment as indicated from studies in conjunction with safety engineers; (5) provision for greater eye comfort and reduction of eyestrain through devices worked out in conjunction with the efficiency and illuminating engineers; and (6) reduction in time lost on the job by detection, through eye examinations, of conditions which have been resulting or in the future may result in absenteeism.

With respect to the reduction of human suffering and time lost on the job, I should like to cite the case of a patient who came to me in an industrial eye clinic, complaining of changing vision. He stated that on certain days he was unable to come to work because his vision was blurred, and he actually had accidents on these days; while on other days, his vision was normal and he felt normal.

Having had experience in the eye wards of Bellevue Hospital, I knew this might be a symptom of diabetes affecting the eye. A subsequent study of the blood and urine confirmed the suspected diagnosis. The patient was placed on proper insulin therapy and has since felt fine and has not spoiled his work or had accidents, nor has he lost time from his job because of this complaint.

Dr. Hedwig Kuhn of Hammond, Indiana, cites the use of 30 per cent sodium sulfacetimide solution routinely in cases coming to the eye clinic for removal of foreign bodies and subacute conjunctivitis. The routine use of this new drug, Dr. Kuhn finds, has cut the frequency of visits to the clinic from five to two.

To illustrate the services of the ophthalmologist in the reduction in insurance liabilities, I give the following example:

I was ophthalmologist for two large industrial organizations in which there are a large number of eye injuries due to metallic foreign bodies. Following the usual procedure, these cases were seen by first-aid nurses, and, if necessary, by general doctors on duty. If the case became serious, the patient was sent to the eye clinic where

the ophthalmologist saw him. As a result of this procedure, a large number of the eyes were actually lost. There was improper handling of potentially serious conditions, and failure to recognize intraocular foreign bodies. With the cooperation of the insurance company, I established a rule that if it were necessary to use a spud to remove a foreign body, the case should go immediately to the ophthalmologist in the eye clinic for treatment.

This change in procedure resulted in a reduction of over 50 per cent in the loss of eyes by these two companies.

What I have said so far relates to the duties and objectives of an ophthalmologist in a large industrial organization. But it must be remembered and recognized that the function of the ophthalmologist in smaller organizations is just as important. In the large plant he may be one of a team of ten, working on visual problems, so that his duties are of a highly specialized nature, while in the small plant he may act solely in an advisory capacity.

An interesting program for small industries was instituted by Dr. Harry Gradle, who acted as advisor to small industries in the Chicago area. He felt the programs which were available to large organizations were not available to small ones, although their problems were the same and their need to increase production was just as great. They did not have access to the services of safety engineers, statisticians, medical directors, and so forth, for the solution of their individual problems, and so he proposed a program for industries of 200 to 250 employees in the Chicago area. The Illinois Society for the Prevention of Blindness made available to these small plants the services of a safety engineer, an illuminating engineer, and a visual survey technician, at a very nominal cost, one dollar per employee tested. The plan met with great success, and was reported on in an article* by Dr. Thomas Allen of Chicago.

In conclusion, it may be said that in either large or small industries, the ophthalmologist can serve a very useful function by: (1) helping to increase production; (2) reducing time lost on the job by early recognition and treatment of eye injuries; and (3) reducing the insurance premiums to management by the prevention of accidents and the early and proper treatment of them.

* Published in *Transactions* of the Academy of Ophthalmology and Otolaryngology, May–June, 1946.

Optometric Aspects of Eye Health and Protection in Industry*

Richard Feinberg, B.S., D.O.S.

PRESENTS the rôle of the optometrist as one of a group of professionals carrying on eye safety and job placement work in industry.

THE enormity of the industrial need for attention to eyesight is emphasized by the fact that of the employed persons in this country today, 27 per cent of them are employed in the manufacturing industries.

We now realize more than ever before the high correlation between visual efficiency and production efficiency, morale, and absenteeism. We realize more than ever, also, that safety usually is very dependent upon the seeing process. From these facts stems the corollary that efficient seeing in industry is, to a great extent, the responsibility of the employment director as well as the medical director or the safety director.

As former supervisor of an eye service in industry, I soon became aware of the fact that most people who *complain* of poor vision seek professional attention ultimately because of their visual discomfort, but that many of those who do not complain, often to their surprise, are in equal need of professional assistance. Both groups need careful vision classification so that they may be correctly placed on tasks which they can perform best. No longer is the Snellen test chart the criterion of such placement. We know now that seeing tasks require complexes of visual skills and that to ascertain these, tests of greater refinement and scope than the

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Snellen test provides are required. The placement of an individual based solely on a 20/20 chart reading soon will be as obsolete as the dinosaur. Visual skill testing techniques rapidly are taking its place.

Our experiences of the past few years have taught us that placement of employees so that they can work with optimum efficiency and comfort requires the combined skills of the psychologists, engineers, ophthalmic professions, technicians, industrial relations personnel and many others, each contributing some of the knowledge which is unique to it. The overlap is very small!

The optometrist is singularly adapted by university training to handle problems of seeing—from the interpretation of functional seeing test techniques to the application of vision training where it is indicated, or the provision of seeing aids as required. He is capable of excellent cooperation, as has been demonstrated in the past, with the medical, nursing, and engineering professions and with industrial relations personnel.

The point that must be reiterated is that it is necessary for everybody in this field to cooperate for the greatest common good to the public, the employee, the employer, and the professions themselves.

It is pertinent to mention that the American Optometric Association through its Committee on Occupational Vision is carrying on a continuous educational program for its members. It calls to its membership's attention the fact that responsibility for efficient seeing in the industrial plant is not a single responsibility but one which rests upon many shoulders, both inside and outside of the plant. There are so many forces behind the creation and operation of vision programs that no one individual can possibly assume that his is the sole responsibility. Job placement is a joint responsibility. Vision improvement is a joint responsibility. Safety is a joint responsibility. All have their effect not only on production but on each individual employee's career and on the lives of those for whom he must earn a living.

Nursing Aspects of Eye Health and Protection in Industry*

Bethel J. McGrath, R. N.

POINTS out the key position of the industrial nurse in an eye safety program.

A SUCCESSFUL program of any kind, in any field, needs someone to keep eternally after all of the little things that can go wrong after the program has been launched. The nurse may or may not organize the program but she is largely responsible for making it work. In order to do this she must be an intelligent individual with very good training, and one who is not too proud to "do the dishes and carry in the kindling," figuratively, whenever necessary.

Sight saving in industry falls quite largely into the health education area, and the nurse is the key person in interpreting eye health and protection to the worker. The blessings of medical science do nothing for those who fail to seek them. Nurses are in a position to learn of the needs of employed adults and to help them appreciate and secure the assistance that medical science offers.

This is done in many ways, depending upon the circumstances in which the nurse finds herself. The effective development of any phase of a health program within industry depends upon the genuine concern of one or more individuals with its success. The primary concern may be a matter of saving costs; may be stimulated by pride in a safety record or primarily by one's interest in the cost to people in human suffering, where such a program is absent or is poorly organized. This is as true of the vision program

* Presented in Panel Discussion on "Professional Guidance in the Plant Program," held during the 1946 Conference of the National Society for the Prevention of Blindness, November 25–27, 1946, New York, N. Y.

as of others. The interested individual may be the president and owner of the business, some lesser executive, a superintendent, foreman, safety engineer; or it may be the medical director, or a nurse who is the only health worker in a small plant.

If the actual interest begins at the top, an effective program goes into motion much more quickly and effectively than if management merely says, "It's your responsibility, go ahead," and, having given his blessing, forgets about it. A positive interest rather than passive permission means the difference, in many plants, between a first-rate and a sixth-rate program. However, the real concern of any of the above named persons can, over a period of time, create an attitude among workers which will develop a worth-while eye program.

Observation of industrial health programs in many kinds and sizes of industries in many states of our country has shown as wide a variation in eye programs as in other details of health service. No two plants are exactly alike even in a nation-wide chain of industries. Consciousness of eye hazards and efforts to control them have spread rather rapidly during the war years. In small industries with only an on-call physician and no safety director, the nurse is responsible for the effectiveness of the program, and many nurses have done good work.

At a meeting in one of the southern states recently, a nurse gave her annual report to the state nurses' association. She said, "We have a county nurse, a public welfare nurse, a school nurse, and an industrial nurse in our county, and I am all of them." The eye program for small industries in that county is operated in the same way as that for the schools. An employee in the plant has been trained to give initial tests, and, whenever a defect is found, that worker is sent to the nurse (who serves everyone in the county) to be retested. If the nurse's screening verifies the need for correction, the individual is then sent to an oculist. During the course of a year many adverse conditions are detected and corrected. This effort, over a ten-year period, has meant a great deal to sight conservation in that rural community.

In a plant of 650 (in a metropolitan area) a nurse was recently asked by the examining physician to handle the placement of a young woman who was extremely sensitive about her handicap,

poor vision. She had been discharged from former employment for incompetence rather than admit that she could not see. She applied apathetically for a job with another company and was astonished when a vision test did not eliminate her. She could be used as an inspector of small metal parts in the manufacture of electrical fixtures. She begged that fellow employees not be told of her limitations. The nurse talked with me about it. We knew that her own movements would betray her, or at least make people consider her "queer," if she were not well trained and guided at first. I asked whether there was an instructor in her area who could be relied upon to walk with her to and from her workbench, since it was not safe for her to do this alone at first, with her very limited vision. The nurse selected an older woman in the area who liked to take care of people, called her in and shared their secret with her in the girl's presence. She was made the girl's sponsor and was entirely responsible for introducing her to the job and for giving initial instructions about work.

The sponsor did her task well and at the end of a few days she brought the worker to the nurse, who said in effect, "You are doing nice work. You are going to be a success here. You work within limitations but you are no longer vocationally handicapped. You can make a good living. Having overcome your handicap it will no longer embarrass you. You are an attractive young woman. You must not shun young people, they like you. They will admire you very much when they learn that, without using your eyes, you are doing the same work many of them do. You will find many ways to help others because you are a fine, intelligent person. Do not deny them the privilege of helping you in turn, if you occasionally need help to get about safely."

The nurse helped this worker understand that the determination to cover up a handicap keeps it ever the center of the handicapped individual's attention and accentuates it in the consciousness of others. When one accepts it and makes commonsense, workable arrangements to go along with it safely, it may be forgotten by everyone.

Wherever eye examinations are a routine part of preplacement examinations, nurses do much of the initial testing. Just how much testing is done depends upon the medical director. Where extensive

eye work is done in industrial clinics, nurses assist physicians as they would in any eye clinic. Aside from these specific duties, nurses who are with workers all of the time have opportunity to observe many small things which may be important and should be brought to the attention of the attending physician; or, if there is none, they should be discussed with the individual, and reference made to his personal physician. The same principles of follow-up apply to eye findings as to other health examination referrals.

Intelligent nurses, observing a man's job, are aware of the conditions that surround him and the demands made upon his sight, both because of the nature of the task and the light. During the war women examined parachutes of white nylon over brightly lighted tables. Some did this day after day, for several years. I asked nurses if these women complained of eyestrain and headache, and the answer was "no." However, I visited only two small plants where this kind of work was done. Where either glare, or an absence of light, produces eyestrain, accidents, and fatigue, the nurse is frequently the only individual to hear the complaints of the workers involved. She observes the results in patients who call upon her for relief of headaches, or to be treated for injuries occurring because seeing conditions are poor. Some nurses take the situation seriously; others care for individuals, case after case, with little effort to inquire into and relieve the causes. Employees frequently ask the nurse about having their eyes examined and want to know the difference between oculists and optometrists.

The majority of firms still employ workers without a preplacement physical examination. Here heavy responsibility rests upon the nurse to do the right thing without physical findings to guide her. They observe persons daily who complain of headaches which warrant an eye checkup; those who are sensitive to light, who squint and hold reading matter very close; or whose lids are red; or who suffer dizziness and sometimes nausea associated with prolonged eye work. The latter occurs most frequently when working under pressure and in poorly ventilated rooms. An example of this would be women working in the alteration department of apparel shops, before the Easter parade. Seeing is only one factor in the situation, but it is probably the primary one. Those with good

vision or with proper correction suffer less under strain from nervous fatigue and other symptoms.

A few industrial nurses have had experience in eye clinics and are quickly aware of diagnostic signs that betray early symptoms of eye difficulties. The majority of nurses have not had this experience. Any alert nurse, however, is immediately aware of deviations from normal in the persons who visit the dispensary, or in those she observes at their work. A good nurse does not let these pass without attention. Her work is not to tell these people what ails them and what to do about it, but to persuade them to go to a physician for the necessary diagnosis and treatment. This is usually not too difficult. Where an eye safety program is well organized, the nurse is a key person in its operation. Where no such program exists she is in a position to inaugurate one if she is sufficiently impressed with the pricelessness of vision, a gift which most of us take for granted because we have never been without it.

Optical Service in the Plant Eye Program*

C. P. Carlsen

DISCUSSES the responsibility of the optician in the proper fitting of corrective glasses in industry.

IT is the optician's business to see not only that the doctor's prescription is filled, but that lenses are properly adjusted so they will be worn without fuss, thereby assuring good vision at all times.

The prescription written by the refractionist remains but a piece of paper until it is properly fabricated; the many specifications indicated on this piece of paper are the combination of the many lenses put in the trial frame at the time of examination. It is up to the optician to incorporate in one single piece of glass all these requirements. In order to do so, we must take into consideration several factors, i.e., the importance of good field qualities, the optical centers of the lenses, and the proper positioning of the lenses in frames adaptable for a particular use. The term, spectacles, does not refer only to eyeglasses that the office worker may wear, but as well to protective goggles which are used in the factory.

In order to be certain that the optical qualities are correct, certain measurements must be taken in fitting spectacles and goggles. The most important of these is the determination of the interpupillary distance for the particular task for which the glasses are designed—for distance use; for a near task, at 14 or 16 inches; or for an intermediate task at 20 or 24 inches (which category would include the worker at a lathe or bench).

The spectacles can be selected, in many cases, so that the mechanical and optical center of the frames will coincide. However,

* Presented in Panel Discussion on "Professional Guidance in the Plant Program," during the 1946 Conference of the National Society for the Prevention of Blindness, November 25-27, 1946, New York, N. Y.

there are many instances such as in goggles and protective mediums, where the mechanical centers of those openings into which we are to insert lenses may be more widely separated than the distance between the individual's eyes, and for that reason these optical centers must be brought closer together so that the patient will see through the proper position at a given distance.

The importance of considering pupillary distances is of utmost importance. There are those who, because of the nature of their occupation, may require different focused glasses for different ranges. In order that they may have the proper correction for distance or near or intermediate use, they should be fitted with what is known as vocation bifocals or trifocals to fulfill their needs. These glasses, however, have to be properly in position so that the area that they are required to use for a particular work will be in the proper position for the eyes.

The adjustment of glasses is not only important from the standpoint of comfort, so that the patient will be encouraged to use his glasses, but also from the standpoint of effect. If, for instance, these glasses are not properly positioned, not properly tilted in at the bottom for a task that requires use at a bench, or on the other hand if the glasses are not in the proper position for working at the lathe, the worker will not get the proper optical effect. Also, spectacles, whether they are goggles or spectacles for general use, require that the lenses be properly positioned, each a certain distance from the eyes and a like distance in each case. If an unequal distance is provided by positioning one glass farther from the eye than the other, a dissimilarity in the size of optical images results.

In closing, I should like to point out that many, even with subnormal vision, can get glasses in one form or another that will improve their visual acuity to a point where they can fit into useful industry.

Corneal Grafting*

Herbert M. Katzin, M.D.

COMPARES corneal grafting with other grafting operations; and emphasizes the fact that only blindness caused by corneal disease is curable by grafting.

CORNEAL grafting occupies a unique position in the science of surgery because it is the only tissue that can be successfully transferred from one individual to another. Attempts have been made to graft all types of tissues in the human with varying success in terms of durability, but in no instance has it been proven that the donor material has been accepted as part of the structure of the host.

Blood can be transferred from one individual to another. We know, however, that the donor's blood cells will not last longer than the normal life span of the cell. In other words, the blood cell is transferred, lives its life span in the new individual, and then is broken down and no longer exists.

Cartilage has been transferred from one individual to another, particularly by plastic surgeons. This cartilage does not live. It is a well-tolerated foreign body, but does not become incorporated into the tissue of the host.

Bone has been grafted from one individual to another, and even from animals as donor sources. Investigation has shown that the transferred bone does not remain as living tissue. The bone serves mainly as a source of calcium salts which are dissolved out by the host and redeposited in his own bone structure.

Nerve tissue has been transplanted to bridge a gap in an injured nerve, sometimes with success. In this instance the donor nerve

* Presented during the 1946 Conference of the National Society for the Prevention of Blindness, November 25–27, 1946, New York, N. Y.

acts as sort of a tube for the fibers of the patient's nerve to follow through. The true regeneration is really done by the patient.

Skin grafting is most interesting and has been recently studied in the Army. Occasionally men would be so badly burned that there would not be enough remaining skin to graft the burned areas from their own bodies, and they would have to have grafts from other individuals as donors. This donor skin would take, last from six weeks to three months, and then would melt away. That period of time is the approximate time that an epithelial cell, the basic cell of skin structure, lives. The donor grafts were not accepted as part of the patient. In identical twins, skin grafts will take; but of course, these are really the same person. Their chromosome structure is identical. Not even from parent to child does a skin graft take permanently.

In the case of the cornea there are several very special characteristics that make it different from all other parts of the body. The cornea has no blood supply. It receives its nourishment from the fluids that bathe it, particularly from the anterior chamber of the eye, and by diffusion from the surrounding sclera. It also receives some oxygen from the air in contact with its anterior surface. The cornea is really in a form of tissue culture. If a piece of living cornea is transferred from one individual to another, the donor cornea heals in place, is nourished in the same fashion as that of the host, and may remain transparent for an indefinite period of time. The oldest cases are about fifteen years old. There is considerable discussion as to whether the grafted cornea remains alive as such, and lives in the new surroundings, or whether the host gradually replaces the cells of the graft. The host does replace the thin surface layer called the epithelium and the bottom layer called the endothelium. The framework (stroma) of the cornea, which constitutes its largest part, remains unchanged. The cells that nourish the stroma undoubtedly remain alive for some period of time. It is likely that they are gradually replaced over the course of months or years. In the case of patients whose corneas are vascularized, as a result of disease or injury, a graft is much less likely to be successful. This suggests that the fact that the cornea is normally avascular is the reason why the cornea can be grafted at all. Since, however, it has been clinically feasible to do corneal grafting and to

restore vision to those who would otherwise be sightless, a great deal of emphasis has been placed on this subject in recent years.

The Eye-Bank for Sight Restoration, Inc. was set up in 1945 with the initial purpose of providing fresh corneal material for corneal transplantation. It was originated under the aegis of Dr. R. Townley Paton and Mrs. Henry Breckenridge of New York City. The Eye-Bank developed methods for collection and distribution of fresh human eyes, most of which were obtained from the recently deceased. This organization involved a tremendous amount of detail work and education. The flow of eyes was a trickle at first which increased in the course of a few months to considerable proportions.

In conjunction with the Eye-Bank a laboratory was initiated to study the eyes that came through the Bank, and to undertake research on the problems involved. The laboratory studied the preservation of the eyes, the treatment of blood vessels in the cornea, the technical aspects of the corneal graft operation, and so forth. When the supply of eyes became adequate, the vitreous humor was made the subject of intensive study.

The Eye-Bank Laboratory also undertook to train men from other parts of the country and from other parts of the world in the technique of corneal grafting. This is done on animals. The procedure is identical, from the technical point of view, and qualified surgeons have been able to learn the technique of this procedure in a few weeks.

An intensive educational program in the press was conducted by Mrs. Aida de Acosta Breckenridge for the purpose of acquainting the lay public and physicians with the important uses for which eyes can be made available if they are donated after death. The family must give this permission promptly to prevent the deterioration of the tissue. The best results are obtained when the eyes are removed in the first hour following the death of the patient. The response to this program has been very satisfying and a significant number of blind people can now be rehabilitated. It must be clearly understood that the corneal graft operation is one that is of benefit only to those patients who have corneal disease, and that blindness due to other causes is not benefited by this operation; and the Eye-Bank is making every effort to emphasize this fact.

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

Rochester Orthoptic Center

From the time the Rochester Delta Gammas first learned of the desire of one of Rochester's leading ophthalmologists for a trained orthoptic technician, until the Rochester Orthoptic Center opened on June 1, 1942, three years had elapsed. The first step, in what often seemed a hopeless effort, was a survey by a committee of Delta Gammas, made at the request of the County Medical Society, of the children in Rochester who needed orthoptic training. Each ophthalmologist was asked to estimate the number of his patients who might benefit from orthoptics. This survey revealed a real need. One attempt was made to give orthoptic training at the eye clinic at Strong Memorial Hospital, but because of changes in personnel, etc., this proved unsuccessful.

After the New York State Commission for the Blind was contacted, however, real progress started as the State Commission was as eager as the Delta Gammas to see some tangible results. Miss Ruth B. McCoy, of the Commission for the Blind, came to Rochester and meetings were arranged by the eye conservation committee of the County Medical Society, of those organizations which might be interested in helping start an orthoptic clinic. After these meetings, the decision was made to establish such a clinic if money could be raised, room found, and a technician engaged.

The Board of Education offered to furnish room, heat, and light in No. 31 School, where the sight-saving classes were located, and this offer seemed to solve the problem of serving all of Rochester's doctors in a central location. A smaller community might decide to locate its clinic in a hospital,

whereas a larger community, such as Rochester, would doubtless find a private center more useful to all doctors. In any community, a consensus as to the type of clinic that would best suit the needs of the community should be obtained.

Dr. LeGrand Hardy, president of the American Orthoptic Council, had estimated that $5,000. would be needed to start an orthoptic clinic. This amount included the purchase of equipment and guaranteed the running expenses for a period of 18 months. The $5,000. was raised by securing contributions from the optical industry, the doctors, the Delta Gammas, and other interested individuals.

At the present time, it is estimated that the optical and office equipment needed for an orthoptic clinic would cost approximately $2,000. The minimum salary for an orthoptic technician today would be $175. a month. In estimating expenses for such a clinic, the salary of a secretary, also, should be included. This amount would, obviously, vary with the community. The optical equipment which would be required for such a clinic consists of: troposcope or synoptophore (the latter is imported from England); loose prisms and prism bar; stripped ophthalmoscope for near muscle light; Maddox rod; set of trial lenses; Worth-4 Dot for distance and near; and vision testing outfit.

When the preliminary arrangements were complete, the Rochester Delta Gammas were asked to be the sponsoring organization for the Center, but felt it was too much responsibility for their small group. Therefore, the eye conservation committee of the Tuberculosis and Health Association assumed responsibility for the establishment and management of the Center.

An advisory committee of 14 persons, representing interested local organizations and the State Commission, was formed. The organizations represented were: Medical Society of the County of Monroe, Rochester Board of Education, Rochester Health Bureau, Rochester Alumnae Chapter of the Delta Gamma Fraternity, Rochester Guild of Opticians, Rochester Optometric Society, Eye, Ear, Nose and Throat Club, Visiting Nurse Association, Tuberculosis and Health Association of Rochester and Monroe County, and New York State Commission for the Blind. This advisory committee was responsible for the establishment of orthoptic training, for the ways and means of providing for the project, and for the appointment of a small medical committee to select orthoptic equipment and establish policies for medical treatment.

New York State Commission for the Blind provided and paid the salary of the technician for six months when the Rochester Center opened. The Delta Gammas fur-

nished volunteer secretarial and receptionist help. The Commission also secured the permanent technician who came to Rochester in November, 1942. The technician had been certified by the American Orthoptic Council and was responsible to the eye physicians on all matters pertaining to orthoptic training, and to the advisory committee for matters of a general nature. Shortly after the permanent technician began work it was found necessary to hire a part-time secretary, and by 1944, the secretary was working full time, replacing the Delta Gammas, many of whom had to give up the volunteer work because of increased home responsibilities due to the war.

In November, 1944, a special school committee was established and the first apprentice started training. Three technicians have been trained: two, upon receiving their certificate from the American Orthoptic Council, returned to the ophthalmologist who sent them for training; the third is now serving as assistant technician at the Rochester Center. With a waiting list, at the present time, of 100 children who need orthoptic exercises, it is felt that the time of another technician could easily be used.

It has been the policy of the Center that anyone can refer patients for training, but they must be examined by an ophthalmologist, either their own, or one on service at the Center. There is a different doctor on service each month and all the ophthalmologists in Rochester refer patients.

The fee charged patients was originally $1.00 for each training period. This fee was waived when inability to pay was indicated. The fee has been raised to $1.50, and $2.00 is charged for the original examination.

The procedure followed is to send about two dozen referral cards to every ophthalmologist The child brings this card when he first comes to the Center. At that time, after examination, a history sheet is prepared with all findings listed, and on it a record is kept of each treatment. A separate financial card is on file showing name, address, and amount paid or charged. Another record, a diagnostic card, is also kept. This is filed according to the type of difficulty a child has, and is completed at the end of the treatments.

After the first examination at the Center the technician reports her findings to the referring doctor. She reports to him again when any change occurs, and also when referring the child back to the doctor for a new refraction, further advice, or when the child is corrected.

In the five years the Rochester Center has been in operation, 731 patients have been seen. The steady increase in the number of cases under training, the practically static waiting list, and the cooperation and support of all Rochester's eye

doctors are sufficient evidence of the service which the Center is giving Rochester and the surrounding area. While the increase in receipts at the Center has almost exactly paralleled the increase in the number of patients under training, it is not likely that the Center will ever be self-supporting. The average daily attendance now is 22. This will obviously increase when the services of another technician are available; but, while the cost per patient decreases, it is doubtful if the operating deficit, which has averaged about $850 for the past two years, will be entirely eliminated.

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Responsibilities of College Authorities for the Eye Health and Efficiency of Their Students*

College authorities are not necessarily responsible for the medical care of their students but it is most important that they have factual knowledge of the physical, mental, social, and economical status of each student in order that they may guide him to get the greatest possible benefit from his college career.

Impressions of the world about him can reach man's brain only through his senses. Of these, the sense of sight contributes more than all the other senses put together. For all individuals, except those totally blind, sight is the chief highroad of educational approach to the brain; therefore, a consideration of eye health and efficiency of all college students is most important in determining their program.

There are many ways in which college authorities may be kept informed on the eye conditions of their students, not only at the time of entrance, but throughout the college career:

1. A certificate of complete medical examination, including an eye examination, may be required for entrance.

2. A screening vision test may be given to all entering students and once a year thereafter during their college life. Those showing deviations that affect their health or educational achievement may be referred for further attention.

3. The college physician may make a medical examination of all entering students and refer those needing an ophthalmological examination for such.

The college should have on file a record of eye examinations for all students. For those requiring glasses or treatment, the record should state the diagnosis, the cause of the difficulty and the prognosis, the prescription for glasses when such are indicated, and the

* Presented at the meeting of the Committee on Handicapped Students, Third National Conference on Health in Colleges, May 7–10, 1947, New York, N. Y.

type of medical treatment if such is needed. The record should include dates for return visits. Such reports should state the recommendations of the ophthalmologist regarding limitations in eye use, participation in gymnastic activities and in athletics, and any special attention that must be given to nutrition, particularly in those cases where lack of vitamin A is indicated.

For all students in the college, illumination meeting accepted requirements in regard to quantity and quality should be provided not only in classrooms, laboratories, libraries, study halls, etc., but in dormitories. Special attention should be given to illumination for students with eye difficulties, according to their individual needs.

So far as educational achievement is concerned, readers may be provided for blind students or for partially seeing students whose visual deficiencies require this help. In some states appropriations are made for this service to blind students. Such help should be extended, when necessary, to students with seriously defective vision.

If no state appropriations are available and the students have no resources to meet the expenses incurred, several ways of obtaining assistance may be suggested:

1. Student cooperation may be invited, in which case, a student taking the same course as that being pursued by the visually handicapped student may *volunteer* to read assignments aloud. In order to avoid overtaxing any student reader it is advisable to have a different one for each subject.

2. Volunteer readers may be obtained through service organizations—Red Cross, women's clubs, etc., or through a prevention of blindness organization in the community.

3. When it is preferable to have a paid reader, students who are working their way through college may be selected. If no funds are available to the college for this service, *Lions Clubs* may be willing to meet the cost.

Consideration should be given by the college authorities to the possibility of the use of a typewriter by visually handicapped students in classrooms, laboratories, etc., in order to facilitate taking notes in lecture courses.

The assistance of a counselor who understands eye difficulties should be made available in the selection of courses and the assistance of a vocational adviser, in the selection of future occupations.

If the college is for the *preparation of teachers*, visually handicapped students should be informed, before acceptance, of any laws in the states in which they expect to teach that require meeting physical standards for certification. This is important in order that they may not select a profession from which the health requirements of

the state may bar them on graduation.

Colleges preparing students to be teachers should include the following in their curricula: anatomy and physiology of the eye in courses in biology; hygiene of the eye, especially in its relation to general health, in courses in health education.

In order to give the most efficient service to the children who will later come under their care, prospective teachers should be given adequate preparation to:

1. Master the necessary skills for giving routine visual acuity screening tests.

2. Appreciate the limitations of such tests and the significance of the findings.

3. Avoid any attempt at medical diagnosis.

4. Recognize behaviors and observable conditions that may indicate visual difficulties.

In addition they should be given a practical understanding of:

1. The quality and quantity of illumination, both natural and artificial, necessary for visual ease and efficiency.

2. The format of educational media—books, maps, graphs, mimeographed material—including the size and kind of type, margins, contrast, paper, etc., in relation to visual efficiency.

3. Recommended school equipment and physical surroundings.

4. The importance of knowing community conditions and resources.

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Note and Comment

National Society's Conference Dates.—The next Conference to be held by the National Society for the Prevention of Blindness will take place April 5, 6, and 7, 1948, at the Radisson Hotel, Minneapolis, Minnesota. Plans are under way, and details of the program will appear in the REVIEW as they develop. It is to be hoped that everyone planning to attend will make reservations directly at the hotel, well in advance.

Rehabilitation of Visually Handicapped.—The Office of Vocational Rehabilitation (Federal Security Agency) and the National Society for the Prevention of Blindness have entered into an agreement to coordinate the functions and services of both agencies to develop maximum opportunities for the rehabilitation of civilians who are visually handicapped but not blind.

Announcement of the agreement was made by Director Michael J. Shortley who pointed out that the Office of Vocational Rehabilitation already has entered into similar cooperative agreements with 18 other organizations interested in problems and welfare of disabled persons.

Under the agreement, the Office of Vocational Rehabilitation and the National Society for the Prevention of Blindness will encourage their State and local affiliates to develop close working relationships for referral of cases and promotion of more effective service for partly sighted persons of work age; undertake, from time to time, research, projects and studies which will be beneficial to vocational rehabilitation; and cooperate whenever practicable in organizing in-service training seminars for vocational rehabilitation personnel.

"Accurate information is not available concerning the number of visually handicapped persons who are not blind, nor the proportion of this group who might require vocational rehabilitation services which are provided by each of the 48 States, the District of Columbia, Hawaii, Puerto Rico and Alaska," Shortley stated, adding:

"The National Society for the Prevention of Blindness estimates that there are at least 800,000 persons who have vision in one eye only.

"We know that the number of visually handicapped persons must be large, as witness results of physical examinations of draft-age men for induction into the armed forces during World War II. Studies conducted by physicians indicate that sizable proportions of these young men—percentages ranged from nine per cent to 21 per cent of the groups surveyed—had ophthalmic defects of varying degrees of severity.

"One study, for instance, disclosed that three per cent of those examined had sufficiently defective vision to be classified in 4-F and 10 per cent were recommended for limited service only.

"From data at hand, it is apparent that only a small portion of visually handicapped persons, who are not blind, are being provided with vocational rehabilitation services under the Federal-State partnership. Therefore, case-finding programs should be organized and developed so this group of handicapped persons may avail themselves of these services.

"This will necessitate adequate relationships between State vocational rehabilitation agencies and workers and agencies engaged in conservation of vision programs, every registered ophthalmologist, each sight-saving class in a given State, eye clinics, workmen's compensation agencies, schools for the blind maintaining sight-saving classes, employers and similar types of agencies and workers.

"I feel that our agreement with the National Society for the Prevention of Blindness points the way to relationships which will have the desired effect."

Shortley pointed out that, in addition to facilities for serving civilians of working age who are handicapped with defective vision and other disabilities, the States have comprehensive programs for vocational rehabilitation of the blind. Thirty-five States are authorized by law to provide vocational rehabilitation through special commissions for the blind. In other States, where special commissions are not authorized, the vocational rehabilitation of the blind is carried out by the agencies which serve the sighted handicapped.

National Society Plans Institute.—The National Society for the Prevention of Blindness is planning a two-weeks' free institute to

cover subjects of interest to workers in health, education, and welfare agencies who are in any way responsible for sight conservation work.

The tentative plans call for the institute to be held at the Society's headquarters in New York City, November 10–21. The course will be informal and will not carry credit or certification. No specific prerequisites in training and experience are required, although it is believed that those with some formal training in social work (casework or community organization), public health nursing or health education, will benefit most from the course.

Application blanks and a tentative outline of the program will be available from the Society upon request.

Michigan Health Department Plans Sight Conservation Program.—The Michigan Department of Health is expanding its activities to include a statewide sight conservation program. Describing the plans for the program, the report provides the following outline:

"The objectives of the Michigan Vision Preservation Program are: (1) the promotion of good visual environment; (2) the development of a pattern for sound vision testing programs; (3) the prevention of visual defects; (4) the detection and correction of visual defects; and (5) cooperation with educators in the development of sight-saving programs.

"The program will be statewide with major emphasis placed on the prevention, detection and correction of eye defects of children of school age.

"The project will be a cooperative one among state and local health departments, medical societies, State Department of Public Instruction, local schools, state and local welfare organizations, Society for the Prevention of Blindness, private agencies such as the Children's Fund of Michigan, service organizations (especially the Lions Club), Michigan School for the Blind, Rackham School of Special Education, and other interested organizations and individuals."

Miss Caroline Austin has been appointed vision consultant and will be responsible for the development and administration of the program. "According to present plans," the report continues, "the

consultant will assist local health departments and schools with the development of their programs on request. Studies of various vision tests will be made. Massachusetts vision testing kits will be loaned to local groups. The vision consultant will instruct locally employed individuals, preferably substitute teachers or nurses who have retired to private life, regarding testing and case finding, and the initial screening procedures. Return visits will be made to areas by the consultant to determine the efficacy of the testing program and the follow-up. Ophthalmological examinations and glasses for children in need of them will be financed by parents, private agencies, service clubs and, in exceptional cases, from MCH funds."

International Association Offers Glaucoma Prize.—An honorarium of $1,000 to promote research work on ophthalmology is offered through the American Members of the Staff of the International Association for the Prevention of Blindness, the judges to consist of the Executive Committee, together with the president and the officers of the Association. The award will be made in connection with the XVIth Concilium Ophthalmologicum. Papers may be presented by any responsible research worker. The subject is to be "Simple Non-inflammatory Glaucoma," and may include anything definitely related to the question. The matter must be new and of such value, in the judgment of the jury, as to merit this recognition. Papers may be written in English or French; and they should be those heretofore unpublished or those published between this date and October 15, 1949. They should be in the hands of the secretary of the International Association for the Prevention of Blindness, 66 Boulevard St.-Michel, Paris, through whom they will be sent to the members of the Judicial Committee, not later than October 15, 1949. The decision of the judges will be final.

Retinitis Pigmentosa.—The newspaper and magazine press has publicized, often beyond the bounds of scientific accuracy, the work of the Russian physician, Filatov, on retinitis pigmentosa. The difficulties of language and trans-communication among European and American scientists throughout the war years have left a gap in knowledge which can be overcome only by the most careful and time-tested observation. Because of the aroused public

interest in the thus-far unsolved medical problem involved in the treatment of retinitis pigmentosa, a professional evaluation of work undertaken to date is of the utmost significance. Dr. Dan M. Gordon, writing on the subject in the May, 1947, issue of the *American Journal of Ophthalmology*, goes somewhat into the history of the treatment of this condition.

Realizing that little experience is recorded in America on Filatov's method, Dr. Gordon undertook a study of Filatov's work with 109 patients suffering from typical or "atypical" retinitis pigmentosa. In evaluating this method of treatment, Dr. Gordon indicates that when a set number of cases do show evidence of improvement, it is important to determine whether that improvement is actual, or whether it is only within the limits of normal variation.

He says further, "If improvement seems to be actual, then the true test of the value of that therapy is its ability either to maintain that improvement for an appreciable period of time, or to restore it, in case of regression, by additional administration of the therapeutic agent. Since the injections of cod-liver oil have resulted in some improvements, any preliminary report would be premature until the other qualifications—is improvement actual, can it be maintained or restored—have been more fully studied.

"Until such time as its merit has been more fully determined, it would be singularly unfortunate if large numbers of ophthalmologists rush into action with this therapy and attempt to evaluate it on very small numbers of patients."

Dr. Gordon's conclusion is as follows:

"A review of the various therapeutic attempts in retinitis pigmentosa has been presented, with especial attention to the details and claimed results of the Filatov method of tissue therapy. No attempt has been made to include a preliminary report of the work with this method, now being carried on at the New York Hospital. However, an attempt has been made to guide the investigator in this method, on the basis of observations made during the work at this Hospital."

Commenting on this subject editorially in the same issue of the *Journal*, Dr. Derrick Vail calls attention to the pitfalls which beset the establishment of any new therapeutic methods, and emphasizes the need for permitting the tests of time and experience to prove

the validity of any treatment. Dr. Vail points out that "the history of medicine is filled with these false alarms that have misfired, or, what is less serious, backfired into the faces of those responsible. What we never discover is the total cost to the afflicted, either in mental distress engendered by their false hopes, or to their pocketbooks, which in our materialistic age seems to be more important."

Referring to Dr. Gordon's article, Dr. Vail says, "The work of Gordon and others is an attempt to evaluate and clarify the premise of Filatov. It is necessary that such work be done under most careful scientific scrutiny and in the Eye Institutes that are especially equipped to carry out such meticulous study."

Safety Glasses Pay Off.—Two Blatz Brewing Company employees in Milwaukee, are firm supporters of the company policy requiring all employees to wear safety goggles on jobs in areas outlined by the plant safety director.

Early in May, one of them was at his position on the inspection line checking for flaws and proper filling. Without warning, a bottle exploded and showered his face with fragments of glass. Three sections of the center area of the glasses were chipped, but his eyes escaped. There was no time for him to turn his head or shield his face. Shortly before this, another employee had a similar experience and again it was the safety glasses that did the eye saving.

Safety glasses are provided without charge to Blatz employees and are ground to specifications in case of correction. The company's position is that the price of goggles is small compared to an eye—no amount of money will replace one.

New Eye-Bank Organized.—In New Orleans, Louisiana, an affiliated Eye-Bank has been organized which will have the cooperation of the Louisiana State University Medical School and the Tulane University Medical School and Hospital, it was announced at the national headquarters of The Eye-Bank for Sight Restoration, Inc. Other affiliated Eye-Banks are functioning in Boston and Chicago.

The officers of the new Eye-Bank are Charles E. Fenner, president; Dr. William B. Clark, 1st vice president; George L. Hardin,

2d vice president; John F. Reilly, treasurer; and John W. Sims, secretary. Mrs. Orville Ewing is serving as executive director.

The Eye-Bank for Sight Restoration, Inc. in New York and its three affiliated Eye-Banks collect and preserve healthy corneal tissue from human eyes for transplanting to blind persons who have lost their sight because of corneal defects, and this tissue is available to surgeons who are qualified to perform the corneal transplant operation. Two other objectives of the Eye-Banks are the training of surgeons in the technique of the delicate corneal graft operation and the furtherance of research studies.

Schoenberg Memorial Award Lecture.—Announcement has been received that Dr. Peter C. Kronfeld, chief of the eye service of the Illinois Eye and Ear Infirmary, will give the first Mark J. Schoenberg Memorial Award Lecture on Monday evening, December 1, 1947, at the New York Academy of Medicine. His subject will be "The Canal of Schlemm."

Members of the committee to choose a lecturer each year in honor of the late Dr. Schoenberg are Isadore Givner, M.D., Chairman; John N. Evans, M.D., Willis S. Knighton, M.D., Adolph Posner, M.D., and James W. Smith, M.D.

Lions Club of New York.—The Lions Club of New York held "A Night of Stars," at Carnegie Hall on Friday, June 27, in the interest of its work for the blind and eye conservation, which includes the granting of scholarships annually for advanced study in eye surgery, to promising ophthalmologists.

Neuropsychiatric Wards Get Safety Glasses.—Safety glasses at reduced rates for all neuropsychiatric ward attendants at the Los Angeles Hospital is the plan of the Veterans Administration Center. Numerous instances of shattered glasses resulting in eye injuries to attendants at neuropsychiatric hospitals indicate that serious consideration should be given to this problem.

Compares Penicillin with Silver Nitrate for Eyes of Newborn.—Writing in the August 9 issue of *The Journal of the American Medical Association*, H. Charles Franklin, M.D., from the Department of Obstetrics and Gynecology, the University of Tennessee College

of Medicine, presents a comparative study of 1,710 infants, 961 of whom were given penicillin and 749 silver nitrate.

The penicillin drops are instilled in each eye, not only immediately following delivery, but once each day for the following three days, as compared with the procedure of a single instillation of silver nitrate drops in each eye immediately following delivery.

Twenty (2.1 per cent) of 961 infants exhibited pus in one or both eyes during or after receiving penicillin drops and 45 (6.0 per cent) of 749 exhibited pus after silver nitrate.

Abnormalities other than the presence of pus were noted in each group, states Dr. Franklin. Swelling of the eyelids was noted in 31 per cent of infants after penicillin application and in 58 per cent after silver nitrate. Redness of the delicate lining of the eyelids was seen in 42 per cent after penicillin and in 72 per cent after silver nitrate. Watery discharge was least frequent and occurred in two per cent after penicillin and in 10 per cent after silver nitrate.

Local Health Units Urged by National Health Council.—Resolutions adopted during the last annual meeting of the National Health Council, held in New York City, endorsed the aim of local health units and urged "that the member agencies of the National Health Council encourage their state and local organizations to discover the extent of present inadequacy of local health services and take an active part in efforts to secure health units suitable for each jurisdiction of local government."

Labor Organization Maintains Eye Conservation Program.—A glance through the *Triennial Report* of the Union Health Center, International Ladies Garment Workers' Union, 1944–1946, discloses a brief description of a thorough-going eyesight care program maintained by the Union Health Center. In 1945 the Center sponsored an industrial eyesight survey to aid the worker as well as to evaluate the visual requirements for industrial efficiency.

"A sample testing of 1,704 workers of varying ages," says the *Report*, "proved that 51 per cent needed some vision correction, 17 per cent more had vision adequate for their specific tasks but needed correction of vision for distance or for some other visual factor. Only 32 per cent of the workers tested had adequate eyesight in accordance with temporary standards established."

The *Report* states further, "The survey, in conjunction with the eye care benefits offered by the locals, stimulated interest in eye examinations among the union members, and an avalanche of would-be eye patients descended upon the Center and swamped its examining rooms. A capacity of 1,500 eye examinations a month was eventually achieved and it was possible to dispense 850 eyeglasses monthly, ground according to the high professional standards established. However, the number of patients requesting service kept well ahead of the number of eye examinations which could be performed and appointments had to be made weeks in advance. Therefore further testing was postponed in order to take care of patients needing immediate attention.

"Nevertheless the survey work yielded some valuable data for use by Center physicians in helping garment workers obtain correct eyeglasses to wear at the job. The survey emphasized a fact that Center ophthalmologists have long known: that eyeglasses for workers at machines have to be adjusted to fit the working distance the machine imposes. For example, a tall woman would have to bend down to her work, a short woman would have to lean back from her work, and a stout woman might have to hold her head at an unnatural angle when all three were required to operate identical machines. If the eye doctor did not understand the working distance at which the worker had to guide her material through the machine, he might not be able to prescribe the correct eyeglasses to enable her to see her work most easily. Incorrect eyeglasses would cause a worker who must hold her eyes only a few inches from her work for long hours to finish the day feeling considerably distressed.

"Incidences of muscle imbalance become higher in people over 40, particularly machine operators who work for hours at short distance with fixed gaze. If eyeglasses for such workers are not prescribed by an ophthalmologist who knows the working conditions, serious difficulties may be created."

The Center's avowed purpose in maintaining its eye clinic is to integrate the eye problem of the patient with the other medical problems which often accompany visual difficulties, and to reduce visual handicaps to a minimum for the benefit of the individual worker, as well as to maintain industrial efficiency.

Waterfront Interested in Color Code.—"Protective color is proving invaluable in reducing accidents in other industries; it can do the same job on the waterfront," is the feeling expressed by *The Preventer*, official safety organ of the Waterfront Employers' Association of the Pacific Coast. The Association is plugging for the adoption of a color code such as that promulgated by the American Standards Association for use aboard ships and ashore.

Employability and Physical Fitness.—Physical fitness should be measured by employability rather than by the stringent standards of the wartime armed services, according to Jean Spencer Felton, M.D., of Oak Ridge, Tenn. Writing in the June 19 issue of *Occupational Medicine*, Dr. Felton, who is Superintendent of the Health Department of Monsanto Chemical Co., Clinton Laboratories, analyzes 10,834 consecutive preplacement physical examinations conducted during 1944–1945, for placement of workers in 67 different occupations, 56 of which were capable of being filled by women.

On the basis of physical findings, the workers were classified as A, physically qualified for all positions, B, physically fit for restricted work only and C, physically disqualified. The study showed 98.8 per cent (physically fit plus physically impaired) to be employable, and only 1.2 per cent physically unqualified to fill any of the numerous available positions.

Among the men in group B, the predominant diseases diagnosed were of the bones and joints (264), cardiovascular-renal (pertaining to the heart, blood vessels, and kidney) diseases (242), disease of the eyes (197) and hernia (111). Among the women, cardiovascular-renal diseases (80) led the list, followed by endocrine disorders (64), diseases of the eyes (38) and diseases of the bones and joints (33).

Edward Coleman Ellett, 1869–1947.—The National Society for the Prevention of Blindness suffered the loss of one of its distinguished vice presidents and Board members in the death of Dr. Edward C. Ellett. Dr. Ellett's achievements need no recounting. Many were his honors. He had attained the heights, professionally and personally. It was as a co-worker in the cause of prevention of blindness that we were able to know his warm generosity and his wise counsel, and it is the solid structure of the prevention of blind-

ness movement to which he had contributed so much that will remain an everlasting memorial in his honor.

National Society Notes.—Indicative of the breadth of the Society's activities is the variety of meetings in which it has been taking part in recent months. Some are the Centennial Session of the American Medical Association; the New England Health Institute; the 13th Annual Convention of the American Osteopathic Association; the Ninth Quadrennial Congress of the International Council of Nurses; and the 52nd Congress of the American Association for Health, Physical Education, and Recreation.

Forthcoming meetings include the Annual Session of the Medical Society of the State of Pennsylvania; the 75th Annual Meeting of the American Public Health Association; the 35th Annual Meeting of the National Safety Congress; the Meeting of the American Academy of Ophthalmology and Otolaryngology; and the U.A.W.–C.I.O. Annual Convention.

The National Society's 16-mm. two-reel sound motion picture, *Eyes for Tomorrow*, has been reduced from $50.00 to $37.50 a print, and the rental charge has been reduced from $5.00 per showing day to $2.00, in order to make it available to a larger number of agencies whose budgets have not permitted the extensive use of the film.

As may be recalled, the film deals with the relationship between eye health and general health; the importance of premarital examinations and prenatal care. It stresses ocular implications of contagious diseases; industrial hazards and the importance of good lighting and safe working practices in eliminating dangers to the eye; the value and significance of regular ophthalmologic examinations. It outlines symptoms, detection and treatment of glaucoma; visual screening tests, importance of providing special educational facilities for the partially seeing child.

Since its release early in 1944, approximately 151 prints have been sold throughout the United States and Canada.

Among the distinguished visitors at headquarters has been Dr. Mohan Lal, an ophthalmologist from the Aligarh Eye Hospital,

India. Dr. Lal, having been commissioned by the new government in India to spend six months in the United States and other countries, is studying prevention of blindness and rehabilitation of blind programs in order to make suggestions for the government's programs in India.

"Seeing Through Life," an 18″ x 25″ 4-color poster, published by the Society, has undergone a "facelifting" and revision, and is being offered for sale at cost, or 30 cents a print. The inclusion of one or two new items and the use of modern figures and attractive colors have enhanced the popular appeal of the poster, and orders are being received from all parts of the country.

Assistant Surgeon General Herman E. Hilleboe, U. S. Public Health Service, long a member of the Society's Board of Directors, has been appointed Health Commissioner of the State of New York, succeeding Dr. Edward S. Godfrey, Jr., who recently retired.

Dr. Conrad Berens, member of the Executive Committee as well as Board of Directors of the National Society, has been elected a vice president.

Current Articles of Interest

Milestones in Sight Conservation, Franklin M. Foote, M. D., *The Yale Journal of Biology and Medicine,* March, 1947.

Presents a historical picture of the public health aspects of sight conservation. Such topics as causes of blindness, trachoma, eye health of the growing child, including sight-saving classes, industrial aspects of ophthalmology, and glaucoma, are briefly presented.

The author comments, in closing, on the necessity for standardizing vision testing for children of various ages through college; the desirability of the cooperation of private physicians and health departments in keeping the public informed about the dangers of glaucoma after the age of 35; and in general the need for eye health to play a prominent part in any health educational program.

The Restoration and Conservation of Eyesight in Kansas, Elsie M. Bronson, *Journal of Rehabilitation,* published bimonthly by the National Rehabilitation Association, 1114 56th Street, Des Moines 11, Iowa.

This is the success story of sight conservation in Kansas from the initial step in 1937, when the Legislature passed the Kansas Social Welfare Act providing for aid to the needy blind, to the present expanded sight-saving program.

The author traces the development of the program and evaluates its progress as follows:

". . . We feel that much progress has been made. Eligibility, at first most restrictive, has been liberalized to include any person whose income does not permit the expense of eye care. Any serious eye condition may be treated. Treatment is extended to include care necessary for the comfort of the patient, especially in emergencies, even though it may not restore sight or prevent blindness. The function of the program was broadened to include services for partially sighted children and offers assistance in working out individual educational problems of partially sighted children. Strabismus was added to conditions treatable.

"Our greatest problems now are within the area of case finding, but we hope to be able, through community and agency interpretation, to be more effective in making available the services to everyone who needs them. We hope to emphasize more and more the preventive phase of the program, to the end there will be the minimum of cases of preventable blindness in the State."

Diisopropyl Fluorophosphate in Glaucoma, *Medical Times*, March, 1947, published monthly by Romaine Pierson Publishers, Inc., 67 Wall Street, New York 5, N. Y.

This article reports on findings of a study of treatment of glaucoma with diisopropyl fluorophosphate (DFP) which, of the various fluorophosphates studied, seems to show the most promise. Treatment, results, and side effects are discussed and the following uses are indicated:

"1. DFP produces little discomfort in patients with glaucomatous, aphakic eyes, and it appears to be a most effective agent in controlling the tension in such eyes.

"2. DFP is able to overcome the pupillary and accommodative effects of atropine and should prove of therapeutic value in preglaucomatous and glaucomatous eyes unfortunately and inadvertently treated with atropine.

"3. DFP may be helpful in controlling the tension in eyes in which operation must be postponed and pilocarpine or physostigmine has proved ineffective.

"4. DFP properly may be used initially in relief of acute congestive glaucoma, since it is a more powerful agent than physostigmine. It is believed that DFP, being an anticholinesterase agent can be used in eyes in which physostigmine formerly was employed."

Diseases of Arteries and Their Relationship to the Eye, C. G. McDonald, *Transactions of the Ophthalmological Society of Australia*, Volume V, 1945, published annually by The Ophthalmological Society of Australia (British Medical Association), 27 Commonwealth Street, Sydney, Australia.

In the hope of effecting a closer relationship between the ophthalmologist and the general physician, the author of this article

has presented a searching analysis of the relationship of diseases of the arteries to the eye. It covers 47 pages of compact discussion, including some technical illustrations. The following topics are included: atheroma, syphilitic infection of arteries, Mönckeberg's sclerosis, senile atrophy of arteries, Buerger's disease, essential hypertension, malignant hypertension, nephritis and its vascular lesions, and the fundus oculi in hypertension and nephritis.

Orthoptic Treatment—A Beneficial Procedure When Properly Used, Fred C. Larimore, M.D., *The Journal of School Health,* March, 1947, published monthly except July and August by the American School Health Association, 3335 Main Street, Buffalo, New York.

The author lists in order of amenability to treatment three major groups in which orthoptic treatment is beneficial: phorias, consisting of those patients having muscle imbalance without actual strabismus; amblyopias without pathology; and tropias of accommodative type or those due to great refractive defects. Most orthoptic techniques aim at improving coordination in some cases, and either accelerating or diminishing response to stimuli (whichever the case may require) in others. The author believes that these techniques are ideally suited for use in clinics, and recommends the establishment of many low cost orthoptic clinics as the best means of satisfying public need.

Pathogenesis of Mongolism, Theodore H. Ingalls, M.D., *American Journal of Diseases of Children,* March, 1947, published monthly by the American Medical Association, 535 North Dearborn Street, Chicago 10, Illinois.

Describing the pathology of mongolism, the author refers to eye characteristics as follows; "The eye has a narrow palpebral fissure, usually slanting upward and outward. An epicanthal fold was evident in 39 per cent of Brushfield's patients. Jansen ascribed the orbital slant to dwarfism of the nasal bones. Ormond reported some form of opacity of the lenses in half of his 42 cases, varying from a single opaque dotlike mass to a completely formed lamellar cataract. Strabismus is not uncommon and occasionally develops after birth."

"Blue Haloes" in Atebrin Workers, Ida Mann, *The British Journal of Ophthalmology*, January, 1947, published monthly by The British Journal of Ophthalmology Ltd., 24–27 Thayer Street, London, W.1, England.

Dr. Mann describes a new industrial disease found among atebrin workers. It is a disease of the cornea, apparently caused by an intracellular deposit of an insoluble derivative of atebrin. The symptom is the patient's seeing blue haloes around lights. Prognosis is excellent when the patient is removed from contact with atebrin dust.

The author concludes, "The investigation of this new industrial disease is chiefly of interest from the physicochemical point of view and from the importance of the differential diagnosis of glaucoma which its history suggests."

Distribution of Penicillin in the Eye After Subconjunctival Injection, G. W. S. Andrews, M.R.C.S., *The Lancet*, May 3, 1947, published weekly at 7 Adam Street, Adelphi, W.C. 2, London, England.

The author provides the following summary:

"The distribution of penicillin in the various tissues and fluids of the eye has been studied in rabbits after subconjunctival injection of 50,000 units of pure sodium penicillin dissolved in 0.5 c.cm. of normal saline into one eye.

"In the injected eye high levels were found in all the tissues of the eye except the lens and the vitreous; within three to six hours these levels had fallen to below an adequate bacteriostatic level.

"A similar distribution was found in the opposite (uninjected) eye, but with lower levels. The penicillin content of most of the tissues of the opposite eye exceeded that of the blood.

"The highly purified penicillin now obtainable is nonirritant to the eye and can thus be safely given in large doses by subconjunctival injection with the production of very high local concentrations in the ocular tissues. Its use may prove a valuable advance in the treatment of infections of the eye by penicillin-sensitive organisms."

The Nurse in an Industrial Program, Richard Feinberg, B.S., D.O.S., abstracted in the Spring, 1947, REVIEW, from the *American Journal of Optometry*, was originally written for and published by the Liberty Mutual Insurance Company in their series for the industrial nurse entitled "Health at Work," according to information received from the author.

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